

AMENDMENT UNDER 37 C.F.R. § 1.116

Application No.: 10/029,204

Atty Docket No.: Q63141

REMARKS

Claims 1 to 8, 10, 12 to 17 and 19 to 21 are all the claims pending in the application.

The Examiner has acknowledged applicants' claim for domestic priority based on a provisional application filed on February 16, 2001. The Examiner states, however, that applicants have not filed a certified copy of the Japanese language Provisional Application as required by 35 U.S.C. § 119(e) and refers to MPEP 201.11(F).

Applicants are not aware of any requirements to file a certified copy of the provisional application. MPEP 201.11(F) and 35 U.S.C. § 119(e) require that a proper reference to the provisional application be included in the first sentence of the application. The present specification contains such a reference. Accordingly, applicants request the Examiner to indicate that applicants do not have to file a certified copy of the provisional application.

The Examiner objects to the title of the invention as being not descriptive. The Examiner suggests that the title be changed to --Magnetic Recording Medium Utilizing a Multi-Layered Soft Magnetic Underlayer, Method of Producing

Applicants have amended the title in the manner proposed by the Examiner.

Claims 1-7, 10, 13, 14, 16, 17, 20 and 21 have been rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,792,564 to Hikosaka et al, as evidenced by U.S. Patent No. 6,391,430 B1 to Fullerton et al.

Applicants submit that Hikosaka et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

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The present invention, as set forth in claim 1, relates to a magnetic recording medium comprising, in sequence, on a nonmagnetic substrate, at least one soft magnetic underlayer, an orientation control layer to control the orientation of the layer immediately above, and a perpendicular magnetic layer having an axis of easy magnetization which is oriented mainly perpendicularly to the nonmagnetic substrate. The soft magnetic underlayer has a multilayer structure having a plurality of soft magnetic layers comprising a soft magnetic material, and one or more separation layers interposed between the soft magnetic layers, and at least one of the soft magnetic layers comprises a material with a structure having no magnetic domain walls.

As set forth in claim 1, the direction of magnetization of an upper soft magnetic layer is different from the direction of magnetization of a lower soft magnetic layer, and the direction of the magnetization of the soft magnetic layer is along the radius of said nonmagnetic substrate and is oriented towards the periphery of the substrate or towards the center of the nonmagnetic substrate.

In another aspect of the present invention, as set forth in claim 16, a method is provided for producing a magnetic recording medium, in which a magnetization of the soft magnetic layer is directed along the radius of the nonmagnetic substrate towards the periphery or the center of the nonmagnetic substrate.

In still another aspect of the present invention, as recited in claim 20, the present invention is directed to a magnetic reproducing and recording device, in which at least one of the soft magnetic layers comprises a material with a structure having no magnetic domain walls, and

a direction of magnetization of the soft magnetic layer is along the radius of the magnetic substrate.

With respect to claims 1, 16 and 20, the Examiner relies on Figures 4 and 5 of Hikosaka et al and the disclosures relating thereto. The Examiner states that Figure 4 discloses a non-magnetic layer in the form of element 13, which the Examiner states is the same as applicants' "orientation control layer". Figure 4 of Hikosaka et al, however, does not contain an element 13. Instead, Figure 5 of Hikosaka et al contains an element 13 as a nonmagnetic layer. The Hikosaka et al patent does not describe this layer 13 in detail.

The Examiner argues that the disclosed structure in Figure 5 of Hikosaka et al would inherently satisfy the recitations of the present claims. The Examiner relies on the disclosure of column 10, lines 15-20, of Hikosaka et al, and the disclosure in the drawings of the Fullerton et al patent, and the disclosure at column 4, lines 54 to 57 of Fullerton et al, to arrive at his conclusion that Hikosaka et al inherently disclose the recitations of the present claims.

According to the Examiner, in Hikosaka et al, antiferromagnetic films generate a bias magnetic field in the radial direction of a medium. In contrast, in the present invention, a soft magnetic layer is magnetized in the radius of a medium. As indicated by the Examiner, it is expected that a soft magnetic layer, which contacts an antiferromagnetic film, is magnetized in the radius of a medium, in the case in which an antiferromagnetic film is magnetized in the radius of a medium. However, in this case, each of the upper and lower soft magnetic layers that contacts the antiferromagnetic film are magnetized in the same direction of the medium. That is, the directions of the magnetization of the upper and lower soft magnetic layers are not

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antiparallel. Therefore, Hikosaka et al do not disclose or suggest, and do not provide any motivation for one of ordinary skill in the art to make, the directions of the magnetization of the soft magnetic layers antiparallel as in the present invention.

The Examiner states that the Fullerton et al reference is being employed as evidence to illustrate that antiferromagnetically coupled layers inherently have magnetization directions which are anti-parallel to each other.

In Fullerton et al, the arrows in the Figures show the direction of the magnetization of ferromagnetic films. That is, Fullerton et al disclose media having ferromagnetic films that are patterned and used as data bits. Therefore, Fullerton et al is not relevant to the present invention which has soft magnetic layers.

For the above reason, applicants submit that the prior art products of Hikosaka et al do not necessarily possess the characteristics of the products as currently claimed.

In view of the above, applicants submit that Hikosaka et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claims 1, 3, 4, 8, 10, 14, 16 and 20 have been rejected under 35 U.S.C. § 102(e) as anticipated by Shukh et al.

Applicants submit that Shukh et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection

Shukh et al (USPA 2002/0028357A1) disclose the existence of magnetic directions of soft magnetic layers in Fig. 3. However, the Shukh et al patent specification does not specify the magnetic directions. Therefore, in the Shukh et al invention, it cannot be understood from the

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arrows in Fig. 3 that the magnetic directions of the soft magnetic layers (48, 50, 52 and 54) are along the radius of a substrate (38, Fig. 2) and are oriented towards the periphery of the substrate or towards the center of the substrate.

In the present Office Action, the Examiner states that he considers that Figure 3 illustrates that the magnetization directions are in the radial direction because of the similarities between the Shukh et al invention and the disclosure in the present application. The Examiner states that there is no evidence of record that the Shukh et al invention would not necessarily possess the magnetization directions oriented in the radial direction since the soft magnetic underlayer is a multi-layered underlayer wherein the magnetization directions of adjacent layers are antiparallel.

According to the Examiner, Shukh et al disclose the upper and lower soft magnetic layers in which the directions of magnetization are antiparallel. However, Shukh do not disclose the direction of magnetization of a general medium having upper and lower soft magnetic layers. That is, it is possible to recognize the direction of magnetization of a general medium to any direction (for example, a track direction) for one of ordinary skill in the art. Therefore, Shukh et al do not disclose a definition that the directions of the magnetization of the soft magnetic layers are generally in the radial direction of the medium.

In view of the above, applicants submit that Shukh et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claim 8 has been rejected under 35 U.S.C. § 103(a) as obvious over Hikosaka et al and further in view of Shukh et al.

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Claim 8 depends from claim 3, which depends from claim 1. Accordingly, applicants submit that claim 8 is patentable over these references for the same reasons as discussed above in connection with the rejections of claim 1 over these references.

Further, according to the Examiner, in Hikosaka et al, each of the directions of the magnetization of the upper and lower soft magnetic layers of the multi layers are the same. However, in Shukh et al, each of the directions of the magnetization of the upper and lower soft magnetic layers of the multi layers are antiparallel. Therefore, since there is a large difference between Hikosaka et al and Shukh et al in the composition of multiple soft magnetic layers, applicants submit that one of ordinary skill in the art would not be led to combining the teachings of Hikosaka et al and Shukh et al, and there is no teaching or suggestion that would lead one of ordinary skill in the art to the present invention by such a combination.

In view of the above, applicants submit that Hikosaka et al and Shukh et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claim 12 has been rejected under 35 U.S.C. § 103(a) as obvious over Hikosaka et al and further in view of Akiyama et al.

Claim 12 depends from claim 1. Accordingly, applicants submit that claim 12 is patentable over these references for the same reasons as discussed above in connection with the rejection of claim 1 over Hikosaka et al.

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In view of the above, applicants submit that Hikosaka et al and Akiyama et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection

Claims 15 and 19 have been rejected under 35 U.S.C. § 103(a) as obvious over Hikosaka et al and further in view of Tang et al.

Claims 15 and 19 depend from claims 1 and 16, respectively. Accordingly, applicants submit that they are patentable for the same reasons as discussed above in connection with the rejection of claim 1 over Hikosaka et al.

In view of the above, applicants submit that Hikosaka et al and Tang et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection

Claims 2, 5-7, 13, 15, 17, 19 and 21 have been rejected under 35 U.S.C. § 103(a) as obvious over Shukh et al and further in view of Tang et al.

Each of these claims depend ultimately from one of claims 1, 16 and 20. Accordingly, applicants submit that these claims are patentable for the same reasons as discussed above in connection with the rejection of claims 1, 16 and 20 over Shukh et al.

In view of the above, applicants submit that Shukh et al and Tang et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claim 12 has been rejected under 35 U.S.C. § 103(a) as obvious over Shukh et al and further in view of Akiyama et al.

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Claim 12 depends from claim 1. Accordingly, applicants submit that claim 12 is patentable over these references for the same reasons as discussed above in connection with the rejection of claim 1 over Shukh et al.

In view of the above, applicants submit that Shukh et al and Akiyama et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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